GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Vocation

Level: Under Graduate

Branch: Food Processing and Quality Control

Subject Code: BV01009031

Subject Name: Basic Microbiology

w. e. f. Academic Year:	2024-25
Semester:	1
Category of the Course:	Professional Core

Prerequisite:	NA
Rationale:	The "Basic Microbiology" course introduces students to foundational concepts in microbiology relevant to food processing and quality control. It covers the structure, classification, and functions of various microorganisms and explores their roles in food safety, fermentation, and preservation. This knowledge is essential for understanding how microbes impact food quality, shelf life, and safety, helping students apply microbial control techniques and ensure compliance with food safety standards.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Identify the microorganisms based on their structural and growth characteristics
02	Understand the methods to control microorganisms
03	Implement quality control measures to ensure food safety and quality.
04	Develop concept of genetic transfer mechanisms leading to multidrug resistance.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	0	3	50	0	0	0	50

Course Content:

Unit No.	Content	No. of Hours	% of Weightage

1.	**Introduction to Microbiology** The scope and history of microbiology**.**	6	13
2.	**Morphology and Fine Structure** External and Internal structures of Bacteria, (membrane and major organelles, Appendages, Spores).	7	15
3.	**Identification of Microbes** Principles and types of different microscopes.	6	13
4.	**Microbial world** Distribution of microorganism in nature Introduction to prokaryotic world, eukaryotic microorganisms. Difference between prokaryotes and eukaryotes**.** Types of microorganism: bacteria, viruses, fungi, yeast, actinomycetes, protozoa**.**	8	17
5.	**Significance of Microorganisms in Foods** Primary sources of microbes in food, Role of intrinsic and extrinsic parameters that effect microbial growth in foods.	7	16
6.	**Fermented Foods** Starter organism, Probiotics, Prebiotics, Synbiotics, functional foods, Fermented foods (dairy, traditional, meats).	6	13
7.	**Control of Microorganisms** Control of microorganisms by Physical and Chemical agents.	5	13
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**15**	**15**	**20**	**15**	**15**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. General Microbiology by Roger Y. Stanier, John L. Ingram, Mark L. WheelsandPage R. Painter. (Macmillan Press Ltd.)
2. Microbiology by M. J. Pelczar Jr., E.C.S Chan and Noel R Krieg. Tata McGraw-Hill
3. Food Microbiology, W C Frazier and D C Westhoff, McGraw Hill Book Company,NY

(b) Open-source software and website:

1. **USDA FoodData Central -** https://fdc.nal.usda.gov/
   Useful for accessing data on food components, nutrients, and microbial quality standards.

2. **National Center for Biotechnology Information (NCBI) -** https://www.ncbi.nlm.nih.gov/
   Offers databases like GenBank for genetic information on microbes and access to research on foodborne pathogens.

3. **Open Food Facts -** https://world.openfoodfacts.org/
   A collaborative database that includes information on food products, labeling, and microbial safety.

4. **R and Python Libraries (e.g., BioPython for microbial genetic analysis)**
   Useful for data analysis, modeling microbial growth, and conducting microbiological data analyses.

5. **European Food Safety Authority (EFSA) -** https://www.efsa.europa.eu/
   Provides extensive resources on food safety assessments, including microbiological safety guidelines.

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